

Topic 4A: Energy Work and Power

Skill 28: Forms of Energy

Energy - the capacity to do work (apply a force to move something)

- SCALAR Quantity measured in Joules (equal to $\text{kg m}^2/\text{s}^2$ or Nm)

Energy can be divided into 2 categories

- Kinetic energy - related to the motion of an object

$$KE = \frac{1}{2}mv^2$$



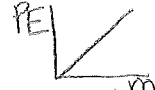
KE motion

- Potential energy - Stored energy

This class covers 2 forms

Gravitational Potential Energy (PE) due to position in gravitational field

$$PE = mgh$$

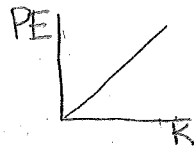
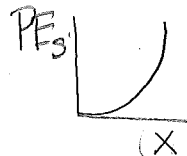


PE height

Elastic (Spring) potential Energy (PE_s) due to stretch or compression of a Spring

$$PE_s = \frac{1}{2}kx^2$$

[recall k is the spring constant
 x is the stretch of a Spring]



PE_s - springs

Work (W) must be done for an object to gain or lose energy

$$W = Fd$$

To calculate Work only use the component of force that agrees with direction of displacement

Work is also a scalar quantity measured in Joules (Nm or $\text{kg m}^2/\text{s}^2$)

Total Mechanical Energy (E_T) is the sum of the Kinetic & Potential Energy

Work Force

$$KE = \frac{1}{2}mv^2 \quad PE = mgh \quad PE_s = \frac{1}{2}kx^2 \quad W = Fd \rightarrow \begin{array}{l} \text{horizontal} \rightarrow F_{Ax} = F \cos \theta \\ \text{vertical} \rightarrow F_g = mg \\ \text{springs} \rightarrow F_g = kx \end{array}$$